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# Razlozi za ekstrakcije zuba: ogledna studija

## *The Reasons for Tooth Extractions: A Pilot Study*

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### Sažetak

**Svrha** rada bila je istražiti i ustanoviti primarne razloge za ekstrakciju zuba u trajnoj denticiji. **Materijali i postupci:** Istraživanje smo organizirali od siječnja do ožujka 2007. na Stomatološkom fakultetu u Zagrebu, u Zavodu za endodonciju i restaurativnu stomatologiju i Zavodu za oralnu kirurgiju. Kao metodu odabrali smo upitnik koji je, osim osobnih podataka pacijenta, sadržavao i osnovne razloge za ekstrakciju. Prikupljene podatke statistički smo obradili parametrijskom i neparametrijskom analizom varijance, ovisno o distribucijama dobivenih podataka. **Rezultati:** Ukupno je bilo anketirano 113 ispitanika u dobi od 10 do 85 godina - 61 (54%) žena i 52 (46%) muškarca. S obzirom na to koliko su često odlazili stomatologu, više je bilo neredovitih pacijenata (54,9%). U svim dobnim skupinama najčešći razlog za ekstrakciju bio je karijes (53,4%), a kod većine pacijenata (75,7%) prije toga nije bila provedena nikakva endodontska terapija. Najčešće ekstrahirani zubi bili su prvi trajni molari zbog karijesa (25,3%), a donji frontalni bili su uglavnom izvađeni zbog parodontopatija i to u dobnim skupinama iznad 45 godina (8,7%), a kod mladih bili su ekstrahirani prvi premolari uglavnom iz ortodontskih razloga. **Zaključak:** Zbog opsežnih karioznih destrukcija molara nije bilo moguće obaviti adekvatnu endodontsku i/ili konzervativnu terapiju, pa je ekstrakcija bila jedina terapijska mogućnost. Zbog toga se mora više truda uložiti u preventivne programe kako bi se sačuvalo oralno zdravlje.

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### Ključne riječi

Zub, ekstrakcija; zubni karijes

### Uvod

Za oralno zdravlje vrlo je važno što duže sačuvati zube trajne denticije u čeljusti, jer imaju iznimnu ulogu u osnovnim životnim funkcijama - žvakanju, govorenju i smijanju (1).

Njihov gubitak utječe na biološku, psihološku i socijalnu kvalitetu života pojedinca i zbog toga bi se ekstrakcija trebala obavljati samo u strogo određenim indikacijama (2), kao dio potanko planirane stomatološke terapije. Zagreb, kao glavni grad Republike Hrvatske, s mnogobrojnim stanovnicima koji su došli iz urbanih, ali i ruralnih sredina, ima heterogenu socijalnu strukturu. Iako su prevencija oralnog zdravlja (3) i provedba preventivnih pro-

### Introduction

Oral health in general implies preservation of the permanent-dentition teeth for as long as reasonably possible, in order to support the basic everyday functions such as mastication, speech and laugh (1). Loss of teeth affects adversely the life of an individual - biologically, psychologically and socially; therefore, one should resort to extraction only if strictly indicated (2) within a carefully planned dental treatment. Zagreb, Croatia's capital, has a heterogeneous urban vs. rural social structure. Despite the ever improving oral-health prevention programs (3), a part of patients - due to their lack of will, time or money - failed to receive a timely conservative,

grama sve bolji, kod dijela pacijenata - zbog manjka volje i vremena, ali i financijskih razloga - nije bila na vrijeme provedena konzervativna endodonska ili parodontološka terapija, pa je ostala samo jedna mogućnost - ekstrakcija zuba. Svrha ovoga rada bila je od siječnja do ožujka 2007. ustanoviti razloge za ekstrakcije zuba kod pacijenata Zavoda za endodonciju i restaurativnu stomatologiju i Zavoda za oralnu kirurgiju Stomatološkog fakulteta u Zagrebu te odrediti udjel neuspjele endodonske terapije kod ekstrakcije zuba.

## Materijali i postupci

Autori su pregledali 113 pacijenata različitih dobnih skupina poslanih u Zavod za oralnu kirurgiju radi pregleda i ekstrakcije zuba. Tijekom uzimanja anamneze i pregleda svi su ispunili upitnik koji je sadržavao sljedeće podatke: opće podatke pacijenta (prezime i ime, dob, spol, zanimanje, koliko često odlaze stomatologu); razloge ekstrakcije (karijes, akutni pulpitis, akutni apikalni parodontitis, kronični apikalni parodontitis, absces; parodontitis, vertikalna fraktura krune i/ili korijena, retinirani zub, impaktirani zub, trauma krune i korijena, ortodontski razlozi, protetski razlozi, *dentitio difficilis*/perikoronitis, ekstrakcija na vlastiti zahtjev).

O ekstrakciji zuba odlučivalo se na temelju kliničkoga i radiološkoga pregleda. Kvaliteta endodonske terapije određivala se indeskom PAI (prema Ørstavicku). Anketirani ispitanici bili su obaviješteni o istraživanju i svrsi te su pristali sudjelovati u istraživanju, no bila im zajamčena tajnost podataka. Za statističku analizu rabio se software SPSS 11,0 za operacijski sustav Windows (1999. SPSS Inc., Chicago IL, SAD).

## Rezultati

Ukupno su bila ekstrahirana 193 trajna zuba kod 113 pacijenata. Određeni demografski podaci pacijenata nalaze se u Tablici 1. Raspon dobi bio je od 10 do 85 godina. Sudjelovala je 61 (54%) žena te 52 (46%) muškarca. S obzirom na zanimanje i obrazovanje najveći postotak ekstrahiranih zuba bio je kod umirovljenika - 32,7%, zatim kod osoba sa srednjom stručnom spremom - 29,2% te učenika - 28,3%. Najniži postotak imali su visoko obrazovani

endodontic or peridontal therapy, and consequently extraction was the only option left. The purpose of this study was to identify and investigate the essential reasons for the extractions of the teeth of the permanent dentition in the patients at the Department of Endodontics and Restorative Dentistry and the Department of Oral Surgery School of Dental Medicine in Zagreb, Croatia, in the period between January through March 2007, and to eventually determine the percentage of the failed endodontic treatments prior to actual extractions.

## Material and Methods

The authors have examined a total of 113 patients of various age-groups, who had been sent by their general practitioners to the Department oral surgery, for the purpose of an examination and extraction. Each patient was required to provide the essential personal data, and his/her medical and dental history, as well as current complaints: general personal data (surname, name, age, gender, occupation, frequency of visits to the dentist); reasons for extraction (caries, acute pulpitis, acute apical periodontitis, chronic apical periodontitis, abscess, periodontitis, vertical fracture of the crown and/or the root, impacted tooth, trauma of the crown and the root, orthodontic reasons, prosthodontic reasons, *dentitio difficilis* (pericoronitis), specific request by the patient).

The final decision on an extraction was made on the basis of the clinical and radiological examinations. The level of quality of the previous endodontic treatment, where applicable, was determined by means of the PAI (periapical index by Ørstavick). All patients gave their informed consent for their medical and personal data to be used for the purpose of a research, respecting, of course, their privacy. The software SPSS 11.0 for Windows (1999 SPSS Inc., Chicago IL, USA) was used for the statistic analysis of the data.

## Results

A total of 193 permanent teeth in 113 different patients were extracted. Some demographic features of the patients are shown in Table 1. The age of the patients ranged from 10 to 85. Gender distribution was 61 (54%) female and 52 (46%) male. As for occupation or education, there were 32.7% retired persons, 29.2% with secondary education, and 28.3% students. The lowest extraction rate (9.7%) was among the university-educated patients. Fi-

Tablica 1. Opis uzorka  
Table 1 Sample description

	N	(%)
<b>dob / age</b>		
do / up to 24	32	(28.3)
25-44	31	(27.4)
45-64	30	(26.5)
65+	20	(17.7)
ukupno / total	113	(100.0)
<b>spol / gender</b>		
muško / male	52	(46.0)
žensko / female	61	(54.0)
ukupno / total	113	(100.0)
<b>zanimanje / occupation</b>		
učenik / pupil	32	(28.3)
SSS / G.C.E.	33	(29.2)
VSS / univ. degree	11	(9.7)
umirovljenik / retired	37	(32.7)
ukupno / total	113	(100.0)
<b>učestalost posjeta / freq. of visits</b>		
redovito / regular	51	(45.1)
neredovito / irregular/occasional	62	(54.9)
ukupno / total	113	(100.0)

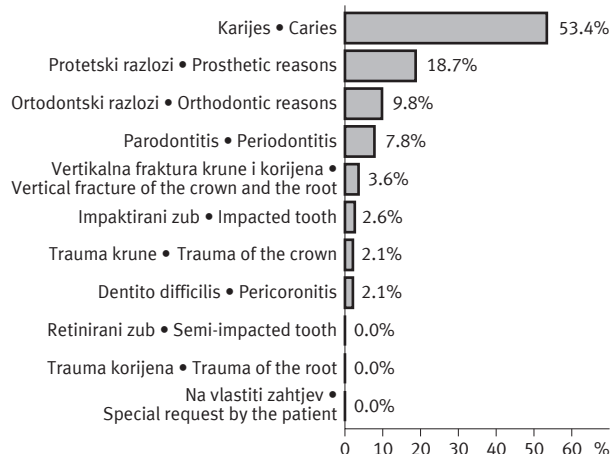
- redoviti pacijenti (oni koji dolaze na kontrolu svakih 6.mj.) • regular patients (patients attending every 6 months)  
- neredoviti pacijenti (oni koji ne dolaze na kontrolu svakih 6.mj.) • irregular / occasional visits (NOT every 6 months)

ispitanici - 9,7%. S obzirom na to koliko često odlaze stomatologu, više je bilo neredovitih pacijenata - 54,9%.

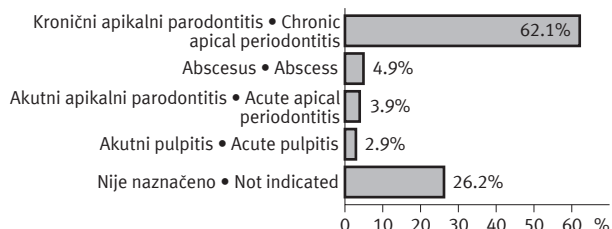
Razlozi za ekstrakciju zuba prikazani su na Slici 1. Zubi su bili najčešće ekstrahirani zbog karijesa - 53,4%, zatim protetskih indikacija - 18,7%, ortodontskih razloga - 9,8% i parodontopatija - 7,8%. Kod 3,6% pacijenata to je bilo učinjeno zbog vertikalne frakture krune i korijena. Ekstrahiranih impaktiranih zuba bilo je 2,6%, a traume zuba i dentito difficilis bili su zastupljeni kod 2,1% pacijenata. U našem uzorku nije bilo ekstrakcija retiniranih zuba te onih s traumom korijena, a nijedan pacijent nije želio ekstrakciju na vlastiti zahtjev.

Razlozi za ekstrakciju zuba zbog karijesa nalaze se na Slici 2. Kao glavni razlog u usporedbi sa svima ostalima, ističe se kronični apikalni parodontitis (62,1%), a absces, akutni apikalni parodontitis i akutni pulpitis zastupljeni su u nižim vrijednostima (4,9%, 3,9% i 2,9%). Kod 75,7% pacijenata prije ekstrakcije nije bila obavljena nikakva endodonska terapija (Slika 3.), a samo su kod njih 13,6% bili neadekvatno ispunjeni korijenski kanali (Tablica 2.).

Zbog karijesa najčešće su bili ekstrahirani gornji i donji trajni molari, a zbog parodontopatija donji



Slika 1. Razlozi ekstrakcije zuba (n=193)  
Figure 1 Reasons for the extraction of the tooth (n=193)



Slika 2. Razlozi ekstrakcije zuba zbog karijesa (n=103)  
Figure 2 Reasons for the extraction of the tooth because of caries (n=103)

nally, with regard to the declared frequency of visits to the dentist, slightly prevailing (54.9%) were those with an irregular history of visits.

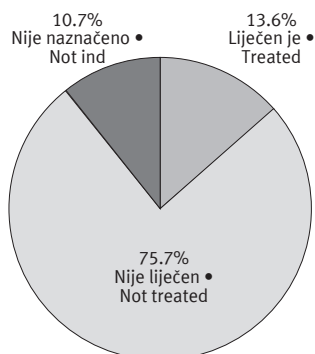
Reasons for the extractions of the teeth are shown in Fig 1. The teeth have most frequently been extracted in the descending order, because of caries (53.4%), prostodontic reasons (18.7%), orthodontic reasons (9.8%), periodontitis (7.8%), vertical fracture of the crown and/or root (3.6), impacted teeth (2.6%), and, finally, with the same percentage (2.1%), tooth trauma, and pericoronitis. Not a single case of semi-impacted teeth, teeth with a root-trauma, or personal request for extraction, were recorded.

Reasons for the extractions of the teeth because of caries are shown in Fig 2. The chief reason within that category was chronic apical periodontitis (62.1%) followed by abscess, acute apical periodontitis and acute pulpitis (4.9%, 3.9% and 2.9% respectively). As has been mentioned elsewhere in the text, 75.7% of the patients did not have any previous endodontic treatment prior to extraction (Fig. 3), whereas in 13.6% an inadequate endodontic treatment had actually been done (Table 2).

Within the caries category, lower and upper permanent molars were most frequently extracted, whe-

**Tablica 2.** Razlog ekstrakcije nakon endodontske terapije  
**Table 2** Reasons for the extraction after endodontic treatment

	N	(%)
neadekvatno punjenje • inadequate filling	14	(100.0)
prepunjenje • overfilling	0	(0.0)
lom instrumenta • separated instruments	0	(0.0)
fausse route • root perforation	0	(0.0)
ukupno • total	14	(100.0)



**Slika 3.** Endodontska terapija prije ekstrakcije  
**Figure 3** Endodontic treatment prior to extraction

frontalni (Tablica 3.). Ekstrahirani impaktirani zubi bili su gornji kanini. Od zuba izvađenih zbog ortodontskih razloga, podjednako su bili zastupljeni prvi premolari gornje i donje čeljusti.

Statističkom analizom potvrdilo se da se parodontitisi i protetske indikacije, kao razlozi za ekstrakciju, javljaju u dobi od 45 godina i pokazali su se statistički znatnima u odnosu prema mlađim dobnim skupinama za parodontopatiju  $p=0,034$ , a za protetske indikacije  $p<0,001$ .

Ortodontski razlozi dominirali su u dobnoj skupini do 24 godine i tu je bila statistički velika razlika  $p<0,001$  u odnosu prema starijim dobnim skupinama. Svi ostali parametri razloga za ekstrakciju nisu se pokazali statistički znatnima  $p>0,05$ , a vezani su za dob i spol naših ispitanika.

## Rasprava

Zbog ove studije anketirani su bili pacijenti Zavoda za oralnu kirurgiju Stomatološkog fakulteta u Zagrebu koje su njihovi stomatolozi poslali na ekstrakciju zuba. Na taj je način bila obuhvaćena velika populacija, bez obzira na socijalni status. Slična studija bila je rađena na Stomatološkom fakultetu Sveučilišta u Jordanu (4). U oba znanstvena rada, kao i u ostalima (5,6), dominirao je karijes kao glavni razlog za ekstrakciju zuba. U našem ispitivanju zubi su najčešće bili ekstrahirani zbog karijesa - 53,4%. U takvim slučajevima karijesne destrukcije zuba bile su toliko opsežne da je ekstrakcija bila jedina terapijska mogućnost. Slične rezultate dala je

reas in the periodontitis category those were lower front teeth (Table 3); of the extracted impacted teeth, those were exclusively upper canines; finally, of the orthodontically indicated extractions, equally represented were upper and lower first premolars.

Statistical analysis shows that periodontitis, or prosthetic indications, as the reason for extractions were occurring in the 45+ age-group of the patients and was, as such, statistically significant if compared to the younger age-groups (periodontitis  $p=0.034$ ; prosthetic  $p<0.001$ ).

Reasonably, within the age-group up to 24 years, orthodontic reasons absolutely prevailed, having a statistic relevance  $p<0.001$  compared to elder age-groups. The remaining reasons for extraction, neither age-wise nor gender-wise showed any statistical relevance ( $p>0.05$ ).

## Discussion

Patients referred by their respective general practitioners for tooth extraction were interviewed for the purpose of this study. As a result of that, the population was large heterogeneous and socially diversified. A similar study was performed the Dental School in the University of Jordan (4). Both this and the Jordanian, as well as some other related studies (5, 6), showed that caries prevailed as the reason for tooth extraction. We have established a caries-related percentage of 53.4%. Due to extensive carious-inflicted destructions, the sole option for those unrestorable teeth was extraction. Similar results were obtained in the study by Zadik et al. (7). Earli-

Tablica 3. Razlozi ekstrakcije pojedinih zuba  
Table 3 Reasons for extraction by tooth-type

zub / tooth	Karijes/Caries	Parodontitis/ Periodontitis	Vertikalnafraktura krune i korijena/ Verticalar fracture of crown and root	Impaktirani zub/ Impacted tooth	Trauma krune/ Trauma of the crown	Ortodontski razlozi/ Orthodontic r.	Protetski razlozi/ Prosthetic r.	Dentito difficilis/ Pericoronitis	Ukupno/total	(%)
11	2	1	1	0	0	0	0	0	4	2.1(%)
12	2	0	0	0	0	0	2	0	4	2.1(%)
13	1	0	0	1	0	1	2	0	5	2.6(%)
14	2	0	0	0	0	5	0	0	7	3.6(%)
15	3	0	0	0	0	0	3	0	6	3.1(%)
16	10	1	1	0	0	0	0	0	12	6.2(%)
17	5	0	1	0	0	0	1	0	7	3.6(%)
18	2	0	1	0	0	0	0	1	4	2.1(%)
21	3	0	0	0	0	0	0	0	3	1.6(%)
22	6	0	0	0	0	0	3	0	9	4.7(%)
23	2	0	1	1	0	0	1	0	5	2.6(%)
24	1	0	1	0	0	6	0	0	8	4.1(%)
25	5	0	0	0	0	0	2	0	7	3.6(%)
26	11	0	0	0	1	0	1	0	13	6.7(%)
27	3	0	1	0	0	0	2	0	6	3.1(%)
28	4	1	0	0	1	0	0	2	8	4.1(%)
31	1	4	0	0	0	0	2	0	7	3.6(%)
32	1	3	0	0	1	0	3	0	8	4.1(%)
33	0	1	0	0	0	0	4	0	5	2.6(%)
34	0	1	0	0	0	3	1	0	5	2.6(%)
35	3	1	0	0	0	0	0	0	4	2.1(%)
36	8	0	0	0	0	1	2	0	11	5.7(%)
37	10	0	0	0	0	0	2	0	12	6.2(%)
38	4	0	0	3	0	0	2	0	9	4.7(%)
41	0	1	0	0	0	0	0	0	1	0.5(%)
42	0	1	0	0	0	0	0	0	1	0.5(%)
43	0	0	0	0	0	0	1	0	1	0.5(%)
44	1	0	0	0	1	3	1	0	6	3.1(%)
45	0	0	0	0	0	0	1	0	1	0.5(%)
46	11	0	0	0	0	0	0	0	11	5.7(%)
47	1	0	0	0	0	0	0	0	1	0.5(%)
48	1	0	0	0	0	0	0	1	2	1.0(%)
ukupno / total	103	15	7	5	4	19	36	4	193	
(%)	(53.4)	(7.8)	(3.6)	(2.6)	(2.1)	(9.8)	(18.7)	(2.1)		(100.0)

i studija Zadika i njegovih suradnika (7). Ranija istraživanja u Hrvatskoj (8), te u drugim europskim i afričkim državama (Škotskoj, Walesu, Keniji i Nigeriji), pokazala su slične vrijednosti (5,9,10,11).

U istraživanju Reicha i Hillera (12), karijes je bio glavni razlog za gubitak zuba u svim dobnim skupinama. Chestnutt i njegovi kolege (13) dobili su u rezultatima njihova istraživanja manje zuba ekstrahiranih zbog parodontopatija u odnosu prema karijesu, što se slaže s našim istraživanjem.

Karijes kao glavni uzrok za ekstrakciju zuba, posebice u starijim dobnim skupinama, može se povezati i s trošenjem te propadanjem postojećih ispuna, što znači da su potrebni redoviti kontrolni pregledi

er related research in Croatia (8) and other European and African countries (Scotland, Wales, Kenya, Nigeria) produced similar results (5, 9, 10, 11).

In the research by Reich and Hiller (12) caries was the principal reason for tooth loss, in all age groups. Chestnutt et al. (13) established a lower number of the periodontitis-related teeth being extracted compared with caries-related, which is consistent with our research.

Caries as the leading cause of tooth extractions, especially in the older-age group, can also be associated with wear and tear of the existing tooth fillings, which calls for regular recall visits, so that development or recurrence of caries can be avoided.



kako bi se prevenirao nastanak novih karioznih lezija i recidiva karijesa. U istraživanju Sanya i njegovih kolega (10) te Murraya i suradnika, (14) najčešće su bili ekstrahirani gornji i donji trajni molari, što se slaže s našim istraživanjem, a može se objasniti činjenicom da ti zubi više sudjeluju u mastikaciji pa su i izloženiji opasnosti od nastanka karijesa. Slično zaključuje i Hassan u svojem istraživanju (15).

Parodontopatije su bile manje zastupljene (7,8%) od karijesa zbog kojega su najčešće bili ekstrahirani donji frontalni zubi (13,16,17,18), što se može objasniti prirodnim morfologijom zuba i njihovim smještajem u zubnom luku. Uspoređujući s prijašnjim studijama, i u našem se istraživanju parodontopatije javljaju u starijim dobnim skupinama iznad 45 godina (18,19,20). Kao najčešći razlozi za ekstrakciju zuba u mlađim dobnim skupinama u našem su se istraživanju pokazali ortodontski razlozi (9,8%). Približno iste vrijednosti dobili su Jovino-Silveira i suradnici (21) u istraživanju provedenom u Brazilu. Od zuba izvađenih iz ortodontskih razloga, najčešće su bili zastupljeni premolari gornje i donje čeljusti (18).

## Zaključak

Ova studija pokazala je da je karijes, bez obzira na dobne skupine ispitanika, najčešći razlog za ekstrakciju zuba. Uglavnom su bili ekstrahirani gornji i donji molari čija je karijesna destrukcija bila toliko opsežna da ih se nije moglo adekvatno endodontski i/ili konzervativno opskrbiti, pa je jedina terapijska mogućnost bila ekstrakcija. Kako bi se sačuvalo oralno zdravlje i poboljšala kvaliteta života, trebalo bi bolje educirati pacijente o važnosti zuba u mastikatornom sustavu, provedbi odgovarajuće oralne higijene i redovitim kontrolama kod stomatologa.

In the study by Saniya et al. (10) and Murray et al. (14) the most frequently extracted teeth were upper and lower permanent molars, which is also consistent with our research, and can be explained by the fact that molars are more involved in mastication and are consequently more exposed to a risk of developing caries. Hassan (15) arrived to a similar conclusion.

In this study, periodontitis as a cause for extraction was less present (7.8%) than caries, referring in most cases to the lower front teeth (13, 16, 17, 18) which can be explained by their natural morphology and their position within the tooth-arch. As has been the case in other studies, in this study, too, periodontitis was remarkably present in the senior age-groups, precisely above 45 years of age (18, 19, 20). As for younger age groups, prevailing reasons for extractions were orthodontic ones (9.8%). Similar results were obtained in another study by Silveira et al. (21) in Brazil. Finally, in our study, the teeth extracted for orthodontic reasons were most frequently upper and lower premolars, similar to the study by Sayegh et al. (18).

## Conclusion

The present study has shown that the most frequent reason for a tooth extraction was caries, regardless of the age of the patient. Most frequently extracted were upper and lower molars, the caries destruction of which was extensive to the point that endodontic and/or conservative therapy was no longer an option, leaving extraction as the only therapy. For the purpose of oral health preservation and improvement of quality of everyday life, patients should be better informed about the role of the teeth in the masticatory system and advised to maintain an adequate oral hygiene and pay regular visits to the dentist.

**Abstract**

The purpose of this study was to identify and investigate the essential reasons for the extractions of the teeth of the permanent dentition. **Materials and methods:** The research was done at the Department of Endodontics and Restorative Dentistry and the Department of Oral Surgery School of Dental Medicine in Zagreb, Croatia, during the period from January through March 2007. The method was based upon a questionnaire which, other than the basic personal data on the patient, also included the essential reasons for each particular extraction. The data collected was then statistically processed by parametric and non-parametric analyses of variance, depending on the respective distributions of the results. **Results:** A total of 113 subjects, within the age bracket 10 - 85, was interviewed. Of that number, 61 (54%) were female and 52 (46%) male patients. With regard to the declared frequency of visits to the dentist, slightly prevailing (54.9%) were those with an irregular history of visits. The principal reason for a tooth extraction was caries (53.4%). Furthermore, 75.7% of the patients did not have any previous endodontic treatment prior to extraction. With regard to the position of the teeth, the most frequently extracted were the first permanent molars, on the account of caries (25.3%). The lower front teeth were extracted mostly because of periodontitis, and in the 45+ age-group (8.7%), whereas in the younger-age groups it was the first premolars, extracted exclusively for orthodontic reasons. **Conclusion:** Due to extensive carious destructions of the molars it was not possible to provide an adequate endodontic treatment and/or conservative therapy, so extraction was the sole option for those unrestorable teeth. It is therefore recommendable that prevention programs be pursued to achieve and maintain oral health.

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**Key words**

Tooth extraction; Dental caries

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